

Descriptions of new species of North American Bees.

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ANDRENA.

In the study of the mutual relations of flowers and insects I have found many insects which I could neither determine myself nor get determined by others. Conspicuous among these are the species of *Andrena*. In order, therefore, to get names for use in my biological work, I have undertaken to describe as best I could the species which occur in my neighborhood. Some of them may have been described before, by Smith, in *British Museum Cat. Hym.* and in *New Spec. Hym. Brit. Mus.* After careful study I have been unable to determine more than two of Smith's species. The fact that a specimen agrees in every detail with Smith's description would not, to my mind, establish the probability of its being the same as its type. His descriptions are limited almost entirely to the colors of the pubescence, which is variable and liable to fade. Thus, of the twenty-four female specimens of *A. Cressonii*, only three show the normal color of the pubescence. The color of the surface is also very variable. The abdomen sometimes varies from entirely red to entirely black. Sets of specimens in which the legs are commonly black, with the apical joints ferruginous, often show individuals having the tarsi, the middle tibiæ at tips, and the hind tibiæ entirely ferruginous.

In all, or most of the species, the ground surface is minutely roughened. Unless there is a distinct punctuation in addition to this, I call the surface impunctate. One trouble with Smith's descriptions is that one cannot always be certain whether he refers to this minutely roughened surface or to a distinct punctuation.

Of the twenty-six species of *Andrena* mentioned in this paper, I have both sexes, except in five cases. I have taken the sexes of eleven species in copula. These bees can best be collected by watching flowers of willows in Spring and of Composite in fall. The females should be identified first and the males referred to them.

I submit a synopsis of all the species which occur in my neighborhood (Carlinville, Ill.) with notes on their time of flight and the flowers which they visit, as well as descriptions of the new species.

Besides those given below I have ten sets of specimens which indicate the presence of several additional species.

Enclosure of metathorax triangular, defined by an impressed line or by absence of pubescence, continued to a point on posterior face of metathorax, rarely strongly rugous.

Face in both sexes without yellow markings.

Abdomen punctate.

Not fasciate.

Abdomen bare, strongly contrasting with the closely hairy thorax.

Pubescence ♀ black, except thorax above, vertex, and about base of antennæ, ♂ paler, with black hairs along the eyes....**bicolor**.

Pubescence fulvous, abdomen black.....**pruni**.

Pubescence pale, abdomen mostly red.....**Perezi**.

Abdomen pubescent, not strongly contrasting with thorax, at most only thinly fasciate.

Large, wings clouded.....**Sayi**.

Smaller, wings clear.....**erigeniæ**.

Fasciate.....**violæ**.

Abdomen impunctate, fasciate, enclosure of metathorax poorly defined.

Abdomen black.....**salicis**.

Abdomen slightly greenish, pubescent, scopa fuscous above..**erythronii**.

Abdomen blue.....**geranii**.

Abdomen greenish, enclosure of metathorax narrow.....**polemonii**.

Abdomen greenish, enclosure of metathorax broad.....**illinoiensis**.

Clypeus of ♂ yellowish, with a dark spot on each side.

Clypeus alone yellowish; abdomen impunctate.

Large, stigma small, thorax densely pubescent.....**helianthi**.

Smaller, abdomen fasciate, basal process of labrum ♀ bifid..**solidaginis**.

Smaller, clypeus shining, impunctate, except on sides..**flavo-clypeata**.

Very small (6—7 mm.), abdomen greenish.....**ziziæ**.

Clypeus and a spot on each side of face yellowish.

Abdomen impunctate.

Small, abdomen greenish**ziziæ**.

Larger, abdomen black.....**asteris**.

Abdomen punctate.

Wings clouded, basal process of labrum bifid.....**rudbeckiæ**.

Wings nearly hyaline, basal process of labrum small, short..**Cressonii**.

Face in ♀ with yellow markings.

A yellow spot on each side.....**pulchella**.

Clypeus yellow.....**alicie**.

Enclosure of metathorax bounded by a salient rim, terminating at the edge of the declivity, commonly truncate, strongly rugous; second segment of abdomen bearing on each extreme side of base an opaque depression, which in the ferruginous species (*marizæ*) appears as a black spot.

Abdomen without fasciæ, or the fasciæ broadly interrupted.

Thorax bare, very sparsely punctured.....**nuda**.

Thorax with fulvous pubescence, closely and strongly punctured..**rugosa**.

Thorax with pale pubescence, abdomen mostly red.....**marizæ**.

Abdomen with white fasciæ, interrupted on second segment.

Thorax with dark fulvous pubescence, strongly punctured....**Forbesii**.

Thorax with pale fulvous pubescence, feebly punctured.....**claytoniæ**.

Belonging to first group, but ♂ unknown, marginal cell and beyond clouded.

nubecula.

A. bicolor F. (= *A. hirticeps* Sm. ♂)

Sixteen females and eighteen males taken from March 23d to May 5th on flowers of *Isopyrum biternatum*, *Dentaria laciniata*, *Viola pubescens*, *V. striata*, *Claytonia virginica*, *Cercis canadensis*, *Cherophyllum procumbens*, *Erigenia bullosa*, *Salix humilis*, *Erythronium albidum* and *Uvularia grandiflora*. I took five pairs in copula on flowers of *Erigenia*, April 7th.

A. pruni ♀.—Black; head as broad as thorax, clothed with pale fulvous pubescence; clypeus rather sparsely and strongly punctured, except a median raised line, which is impunctate; basal process of labrum semicircular, large, not truncate at tip; antennæ with flagellum dull ferruginous beneath; thorax closely, not strongly punctured, the surface concealed by close fulvous pubescence; wings yellowish hyaline, the apical margins faintly clouded, third submarginal little longer than second, nervures, stigma and tegulæ reddish testaceous; enclosure of metathorax minutely roughened; abdomen ovate, depressed, shining, with a thin fulvous pubescence on the sides, segments closely punctured, except a broad, depressed apical portion, which is rufo-piceous, apical fimbria bright fulvous; legs clothed with pale fulvous pubescence, the tarsi, and sometimes posterior tibiæ, ferruginous. Length 11—12 mm.

♂.—Blacker, the wings and pubescence paler, antennæ as long as thorax, more ferruginous beneath. Length 10 mm.

Ten females and one male. There is a strong contrast between the thorax and abdomen, the former being closely pubescent and fulvous, the latter being bare and black.

I have taken it from April 23d to June 2d, on flowers of *Staphylea trifolia*, *Claytonia virginica*, *Viburnum prunifolium*, *Prunus serotina* and *Pastinaca sativa*. The male and female were taken in copula on flowers of *Viburnum*, April 29th.

A. Perezi ♀.—Black, the abdomen red; clypeus flat, not very strongly punctured, a median line impunctate; basal process of labrum broad, semicircular, truncate or emarginate at tip; flagellum dull testaceous beneath; thorax sparsely and feebly punctured, thickly clothed with pale pubescence; enclosure of metathorax finely roughened; wings hyaline, apical margin faintly clouded, nervures and stigma testaceous, tegulæ piceous; legs blackish, tarsi testaceous; abdomen shining, sparsely and very feebly punctured, red, the apical segments often blackish at base, and with broad testaceous apical margins, fasciæ wanting, anal fimbria pale dirty yellow. Length 10—11 mm.

♂.—Resembles the female, clypeus with a dense yellowish white beard, flagellum paler beneath, pubescence a little longer and often more yellowish; abdomen with the segments black at base, reddish beyond, more extensively on the sides, and with broad testaceous apical margins; sometimes the abdomen is entirely black, on γ showing a little reddish at base of testaceous apical margins and on extreme sides. Length 8--10 mm.

Four females and ten males, taken April 17th and 21st, on flowers of *Salix humilis* and *S. cordata*. The sexes were taken in copula. Dedicated to Prof. J. Pérez, of Bordeaux.

A. Sayi ♀.—Black; clypeus rather strongly punctured, with a median impunctate elevated line; basal process of labrum very large, semicircular, truncate at tip; thorax with close shallow punctures anteriorly, scutellum sparsely punctured, postscutellum swollen, enclosure of metathorax rather coarsely reticulated, thorax with short, thin, pale fulvous pubescence; wings fulvo-hyaline, apical margin broadly clouded, nervures and stigma honey-yellow, tegulæ reddish testaceous; legs dull ferruginous; abdomen shining, finely and sparsely punctured, apical margins of segments faintly depressed, the abdomen clothed with pale pubescence, which often forms thin apical fasciæ, anal fimbria fulvous. Length 13—15 mm.

♂.—Resembles the female; head subquadrate, wider than thorax; the pubescence somewhat longer, thicker, more fulvous; wings often paler. Length 9—12 mm.

Twelve females, twenty-three males, taken from April 8th to May 7th, on flowers of *Dentaria laciniata*, *Stellaria media*, *Claytonia virginica*, *Staphylea trifolia*, *Cercis canadensis*, *Prunus serotina*, *Amelanchier canadensis*, *Ribes gracile*, *Erigenia bulbosa*, *Antennaria plantaginifolia*, *Salix cordata* and *Erythronium albidum*. The sexes were taken in copula on flowers of *Salix*, April 28th.

This may be the *A. valida* of Say, or the *A. obscuripennis* of Smith.

A. erigeniæ ♀.—Black; clothed with long whitish pubescence; head as broad as thorax; clypeus strongly punctured; basal process of labrum very short and broad, sometimes slightly emarginate anteriorly; flagellum ferruginous beneath towards tip; thorax with large, shallow, sparse punctures, the surface not concealed by pubescence; enclosure of metathorax longitudinally striate at base, finely roughened beyond; wings yellowish hyaline, nervures and tegulæ dull honey-yellow; legs slender, scopa white, inclining to fuscous at base above, hind tarsi with yellowish hairs; abdomen clothed with thin pubescence, which is longer and whiter towards the apex of the segments, where it forms thin fasciæ, the anal fimbria inclining to fuscous, the segments finely roughened and rather strongly punctured at base, smoother beyond, apical margins testaceous. Length 8—9 mm.

♂.—Resembles the female; face subquadrate, the eyes somewhat wider apart below than above, the clypeal region densely clothed with a long beard of white pubescence; mandibles long, tip of one nearly reaching to base of the other, toothed remotely from the apex and rufous from below the tooth to the tip; antennæ longer, flagellum dull testaceous beneath; wings more hyaline, nervures pale testaceous, second submarginal cell very variable in form and size, sometimes receiving the recurrent nervure beyond the middle, sometimes far before it; middle tibiæ with a slender spine at tip exteriorly. Length 7—8 mm.

Seven females, ten males, taken from March 26th to May 14th, on flowers of *Claytonia virginica*, *Erigenia bulbosa* and *Hydrophyllum appendiculatum*. This species is sometimes infested by *Stylops*. It is closely allied to *A. texana* Cress.

A. violæ ♀.—Black; head wider than thorax, clothed with pale ochraceous pubescence; clypeus strongly produced and strongly punctured; basal process of labrum very large, semicircular, notched at tip; flagellum ferruginous beneath towards tip; thorax sparsely and rather strongly punctured, clothed with thin, pale, ochraceous pubescence; wings yellowish hyaline, second submarginal two-thirds as wide as third, nervures, stigma and tegulæ dull honey-yellow; enclosure of metathorax slightly roughened; posterior tarsi and apical joints of anterior and middle pairs ferruginous; abdomen rather closely, strongly and evenly punctured, margins narrowly testaceous, third and fourth broadly and slightly depressed, 2-4 each with an even, narrow, dense apical fascia of yellowish pubescence, anal fimbria brown. Length 10 mm.

♂.—Closely resembles the female, but the pubescence is paler, flagellum more yellowish beneath, wings more hyaline, nervures and tegulæ darker. Length 8-9 mm.

Four females, two males, taken on flowers of *Viola palmata*, April 20th and 21st. The tongue of this species is remarkably long and slender.

A. salicis ♀.—Black; the pubescence fulvous; head as wide as thorax, clypeus closely and strongly punctured, a median raised line impunctate; basal process of labrum small, truncate; thorax with sparse shallow punctures, the pubescence thin; wings yellowish hyaline, faintly clouded beyond the marginal cell, nervures and stigma honey-yellow, second submarginal one-half as wide as third, tegulæ dark with a dull testaceous spot; enclosure of metathorax finely roughened; abdomen finely roughened, but impunctate, narrow apical margins of segments dull testaceous, apical margins of second, third and fourth segments with a thin fascia of fulvous pubescence, more or less interrupted on second and third, anal fimbria fusco-fulvous; hind tarsi ferruginous or yellowish, the apical joint blackish. Length 8-9 mm.

♂.—Resembles the female; the abdomen not fasciate. Length 7 mm.

Three females, one male, taken from April 10th to 20th, on flowers of *Amelanchier canadensis*, *Salix humilis* and *S. cordata*.

A. erythronii ♀.—Black; clypeus flat, rather rough with transverse rugæ, but not very closely or strongly punctured, a central longitudinal ridge impunctate; basal process of labrum triangular, truncate at tip; thorax sparsely and feebly punctured, clothed with thin, pale fulvous pubescence, enclosure of metathorax finely roughened; wings hyaline, nervures, stigma and tegulæ dull testaceous; legs blackish or dull ferruginous, apical joints of tarsi paler, scopa white beneath, fuscous above; abdomen finely roughened, impunctate, apical margins of segments depressed, the extreme edge pale testaceous the abdomen clothed with thin pubescence, which forms whitish fasciæ on the apical margins of the segments, anal fimbria fuscous. Length 10-12 mm.

♂.—Resembles the female; mandibles long, face subquadrate, clypeus with a thin white beard, head produced behind the eyes; abdomen sparsely and feebly punctured, more greenish than in female, testaceous, apical margin broader. Length 8-9 mm.

Ten females, three males, taken from April 2d to 13th, on flowers of *Eriogonum bulbosum*, *Salix humilis* and *Erythronium albidum*.

A. gerauii ♀.—Blue-black; clothed with long, thin, whitish pubescence; clypeus sparsely punctured, shining, with a faint purplish reflection; basal process of labrum long, narrow, with a rather deep notch at tip; lateral grooves of face filled with a dark, brownish black tomentum; thorax sparsely punctured, scutellum more shining and with more evident metallic reflections, enclosure of metathorax longitudinally striate at base, smoother beyond; wings hyaline, stigma fuscous, nervures fuscous or testaceous, second submarginal receiving the recurrent nervure before the middle, tegulæ piceous, sometimes with a large testaceous spot; abdomen blue, shining, impunctate, apical margins of segments 2-4 each with a thin fascia of white pubescence, anal fimbria dirty white. Length 7-8 mm.

♂.—Closely resembles female; face rounded, thinly clothed with whitish pubescence, mandibles short, toothed near the tip; flagellum long, testaceous beneath; middle tibia with a slender spine at apex exteriorly. Length 6-7 mm.

Three females, six males, taken May 3d and 11th, on flowers of *Geranium maculatum* and *Osmorrhiza longistylis*.

A. polemonii ♀.—Robust; greenish, with bluish and purplish reflections in certain lights, clothed with thin whitish pubescence; clypeus densely and minutely roughened, strongly and sparsely punctured, with a strong purplish reflection; basal process of labrum broad and truncate, flagellum testaceous beneath; thorax sparsely punctured, clothed with thin pale pubescence, enclosure of metathorax finely roughened, poorly defined; wings hyaline, tegulæ and nervures testaceous, second submarginal cell large; abdomen impunctate, apical margins of second, third and fourth segments and anal fimbria with whitish pubescence. Length 6-7 mm.

♂.—Resembles the female; face thinly pubescent, antennæ long, testaceous beneath, middle tibia spined at apex. Length 6 mm.

Three females, one male, taken on flowers of *Polemonium reptans*, on April 20th and 26th.

A. illinoensis ♀.—Form slender; greenish, with bluish and purplish reflections, clothed with thin whitish pubescence; clypeus rather closely and strongly punctured; basal process of labrum small, semicircular; flagellum dull testaceous beneath towards tip; thorax impunctate or nearly so, the scutellum purplish, enclosure of metathorax broad, rough; wings long, yellowish hyaline, nervures testaceous, tegulæ pale testaceous; abdomen impunctate, apical margins of segments testaceous, second, third and fourth with short, thin fasciæ of white pubescence, anal fimbria whitish. Length 7-8 mm.

♂.—Resembles the female; the clypeus densely bearded, flagellum beneath and tarsi usually testaceous; thorax more strongly punctured, middle tibia with a short spine at tip. Length 6-7 mm.

Thirteen females, fifteen males. This species is commonly infested by *Stylops*. I have taken it from April 2d to May 3d, on flowers of *Stellaria media*, *Geranium maculatum*, *Amelanchier canadensis*, *Eriogonum bulbosum*, *Salix cordata* and *S. humilis*. Three pairs were taken in copula on flowers of *Salix cordata*, April 10th.

A. helianthi ♀.—Black, inclining to dull ferruginous; clypeus rather closely and strongly punctured; basal process of labrum short, triangular, truncate or notched; thorax clothed with long, dense, ochraceous pubescence, which conceals the surface, sparsely punctured with shallow punctures, enclosure of metathorax finely roughened; wings clear, hyaline, stigma small, fuscous, nervures pale testaceous, tegulæ entirely pale testaceous; abdomen impunctate, or with fine sparse punctures, broad and slightly depressed apical margins of segments rufo-piceous, apical margins of second, third and fourth segments with thin fasciæ of pale pubescence, often more or less interrupted on the disc, anal fimbria pale fulvous; legs dull ferruginous, posterior tibiæ and tarsi yellowish. Length 12—13 mm.

♂.—Resembles the female: clypeus yellow, antennæ longer, flagellum dull testaceous beneath; all tibiæ at apex, posterior tibiæ exteriorly and all tarsi yellow; abdomen more punctured, broad apical margins of segments pale testaceous. Length 10—11 mm.

Twelve females, eight males, taken on flowers of *Helianthus grosseserratus*, September 12th to 25th.

A. solidaginis ♀.—Black; clothed with thin, white pubescence; clypeus sparsely punctured, more strongly at tip; basal process of labrum deeply bifid, forming two teeth; thorax sparsely and feebly punctured, thinly clothed with whitish pubescence, enclosure of metathorax finely roughened; wings hyaline, nervures and stigma fuscous, tegulæ piceous; legs black, inclining to dull ferruginous, scopa white beneath, fuscous above; abdomen impunctate, or with only sparse, feeble punctures, apical margins of segments 2-4 with narrow fasciæ of white pubescence, anal fimbria fuscous. Length 8—9 mm.

♂.—Resembles the female; the clypeus pale yellow. Length 6—7 mm.

Eight females, two males. I have taken it from September 8th to October 11th, on flowers of *Solidago canadensis*, *S. lanceolata*, *Boltonia asteroides*, *Aster* and *Polygonum hydropiper*.

A. flavo-clypeata Sm. (= *A. bipunctata* Cress.)

This bee flies in Spring. I have taken it from April 5th to May 7th, on flowers of *Stellaria media*, *Claytonia virginica*, *Xanthoxylum americanum*, *Staphylea trifolia*, *Prunus serotina*, *Amelanchier canadensis*, *Eriogonum bulbosum*, *Salix cordata* and *S. humilis*. The sexes were taken in copula on *Salix*, April 10th.

A. ziziæ ♀.—Black, with an obscure greenish reflection, thinly clothed with pale pubescence; clypeus sparsely and feebly punctured, sometimes with a purplish reflection; basal process of labrum small and narrow, mandibles honey-yellow in middle, rufo-piceous at tip, flagellum testaceous beneath; thorax very thinly clothed with pale pubescence, very sparsely and feebly punctured, enclosure of metathorax rather strongly reticulated, unusually rough for a species of this group; wings long, yellowish hyaline, nervures, stigma and tegulæ testaceous; legs dull ferruginous, often inclining to yellowish; abdomen depressed, impunctate, with an obscure greenish reflection, apical margins of segments pale testaceous, segments 2-4 with apical fasciæ of thin, pale pubescence, anal fimbria dirty white. Length 6—7 mm.

♂.—Closely resembles the female; the clypeus whitish, sometimes there is also a white spot on each side of the face between the upper part of the clypeus and the eye. Length 5—6 mm.

Twenty females, ten males, taken from May 7th to June 4th, on flowers of the following Umbelliferæ: *Zizia aurea*, *Pimpinella integerrima*, *Sanicula marilandica* and *Pastinaca sativa*. The sexes were taken in copula on *Zizia*, May 7th.

A. asteris ♀.—Black; clypeus with sparse, feeble punctures; basal process of labrum small, deeply notched; thorax with sparse, feeble punctures, clothed (at least anteriorly) with long, close, dirty white pubescence, enclosure of metathorax finely roughened; wings fusco-hyaline, nervures and stigma fuscous, tegulæ piceous; legs black, basal joint of middle tarsi broad, scopa yellowish white, fuscous at base above, basal joint of posterior tarsi with fuscous pubescence; abdomen impunctate, or with sparse feeble punctures, apical margins of segments pale testaceous, segments 2-4 with thin fasciæ of white pubescence on their broadly depressed apical margins, anal fimbria fuscous. Length 10—11 mm.

♂.—Resembles the female; abdomen more punctate; clypeus and spot on each side yellowish, the former with two elongate dark spots, basal process of labrum bidentate. Length 9 mm.

Two females, one male, taken October 8th and 11th, on flowers of *Aster*.

A. rudbeckiæ ♀.—Black; clypeus closely and strongly punctured, clothed with close, short, pale pubescence, basal process of labrum cleft, forming two sharp teeth, palpi short, flagellum dull testaceous beneath; thorax densely and finely punctured, dorsely clothed with very short, dull ochraceous pubescence, enclosure of metathorax finely roughened; wings fulvo-hyaline, the apical margins clouded, nervures testaceous, stigma small, fuscous, tegulæ ferruginous; legs dull ferruginous, clothed with short pubescence, basal joint of middle tarsi broad; abdomen finely roughened, evenly punctured with large, close, shallow punctures, apical margins of the segments depressed, reflecting golden, with a narrow white line at extreme edge; the abdomen clothed with pale pubescence, which forms fasciæ on apical margins of all of the segments, the anal fimbria golden-yellow. Length 13—14 mm.

♂.—Resembles the female; antennæ short, clypeus and a large spot on each side yellowish white. Length 12 mm.

Eleven females, one male, taken on flowers of *Rudbeckia hirta*, June 12th to 23d. The depressed margins of the abdominal segments vary considerably in color, being sometimes golden, pale yellowish, or reddish purple. The sexes were taken in copula.

A. Cressonii ♀.—Black; clypeus closely and rather strongly punctured, except in median line, basal process of labrum small and very short; thorax clothed with thin, fulvous pubescence, rather closely and strongly punctured, scutellum sparsely punctured, enclosure of metathorax small, rough, commonly with longitudinal ridges; wings fusco-hyaline, apical margins a little clouded, nervures and stigma dull testaceous, tegulæ black, often with a dull testaceous

spot; legs black, posterior tarsi sometimes dull ferruginous; abdomen closely, evenly and rather strongly punctured, apical margins of segments 2-4, interrupted on second, with close fasciæ of white pubescence, anal fimbria fuscous. Length 9-10 mm.

♂.—Resembles the female, process of labrum longer, concave anteriorly, clypeus and large spot on each side of face below antennæ, yellow. Length 7-10 mm.

Twenty-four females, twenty-two males, taken from April 5th to June 4th on flowers of *Stellaria media*, *Claytonia virginica*, *Xanthoxylum americanum*, *Prunus serotina*, *Amelanchier canadensis*, *Zizia aurea*, *Polytenia nuttallii*, *Pimpinella integerrima*, *Sanicula narilandica*, *Pastinaca sativa*, *Heracleum lanatum*, *Salix cordata* and *S. humilis*. The sexes were taken in copula on *Stellaria*, April 8th. Dedicated to Mr. E. T. Cresson.

A. pulchella ♀.—Black; clypeus dull ferruginous, sometimes with an arcuate yellow spot above, rather strongly but not very closely punctured; basal process of labrum broad, very short, emarginate; mandibles ferruginous in middle, black at tip; flagellum testaceous beneath, lower part of face with a large yellow spot on each side, extending below upon each side of clypeus; thorax closely and rather strongly punctured, the surface concealed by thick, rather long fulvo-ochraceous pubescence, enclosure of metathorax finely roughened; wings hyaline, nervures and tegulæ testaceous, stigma small, dark; legs dull ferruginous, the tarsi, especially the posterior pair, inclining to yellowish; abdomen closely, finely and rather strongly punctured, broad, somewhat depressed, apical margins of the segments pale testaceous, with long pale ochraceous pubescence, which forms thin fasciæ, anal fimbria of the same color. Length 11-13 mm.

Seven females, taken from August 30th to September 20th, on flowers of *Helianthus grosse-serratus* and *H. rigidus*.

A. aliciae ♀.—Black, thinly clothed with pale pubescence; clypeus yellow, with a dark spot on each side; basal process of labrum broad, short, slightly emarginate, mandibles not toothed; thorax sparsely and feebly punctured, enclosure of metathorax finely roughened; wings somewhat clouded, nervures and stigma black, tegulæ piceous; legs black, scopa pale fulvous; abdomen opaque, finely roughened, impunctate, or with sparse, feeble punctures, apical margins of segments having laterally narrow fasciæ of white pubescence, anal fimbria fuscous. Length 12 mm.

One female, taken on flowers of *Bidens chrysanthemoides*, Sept. 20.

A. nuda ♀.—Black; clypeus strongly punctured; basal process of labrum large; mesothorax smooth and shining, bare, with very few large punctures, scutellum and postscutellum closely and very strongly punctured; tubercles, a line over the tegulæ, scutellum and postscutellum with short feathery hairs, a row of long hairs on the posterior margin of scutellum; metathorax sharply truncate, rough with coarse reticulations, the disc with strong longitudinal rugæ; wings yellowish hyaline, apical margins faintly clouded, nervures, stigma and

tegulae dull testaceous; legs black, posterior tarsi inclining to ferruginous; abdomen shining, finely and sparsely punctured, segments depressed to the base, not fasciate, anal fimbria fulvous. Length 9--10 mm.

Eight females, taken from April 2d to June 16th, on flowers of *Staphylea trifolia*, *Prunus serotina*, *Pastinaca sativa*, *Erigenia bulbosa* and *Salix cordata*.

A. rugosa ♀.—Black; clypeus closely and strongly punctured, basal process of labrum broad, rather long, truncate; thorax closely and very coarsely punctured, thickly clothed with short fulvous pubescence, enclosure of metathorax bordered by a salient rim, truncate posteriorly, bearing sharp longitudinal ridges; wings hyaline, apical margins faintly clouded, nervures, stigma and tegulae testaceous; legs dull ferruginous, apical joints of tarsi paler; abdomen smooth and shining, densely and finely punctured, segments depressed nearly to the base, the depressed portions of the segments more sparsely punctured, fasciae wanting, except on the extreme sides, anal fimbria fulvous. Length 9--10 mm.

♂.—Resembles the female; less strongly punctured, thorax with the pubescence longer and thinner, antennae as long as thorax, enclosure of metathorax not so well defined, segments of abdomen not depressed beyond the middle, third and fourth segments with continuous apical fasciae of pale fulvous pubescence. Length 7--8 mm.

Twelve females, sixteen males, taken from April 2d to 21st, on flowers of *Dentaria laciniata*, *Claytonia virginica*, *Xanthoxylum americanum*, *Amelanchier canadensis*, *Erigenia bulbosa*, *Salix cordata* and *S. humilis*. The sexes were taken in copula on *Erigenia*, April 6th.

A. marie ♀.—Black, the abdomen red; clypeus closely and strongly punctured, basal process of labrum long and narrow; flagellum dull testaceous beneath; thorax rather closely and strongly punctured, much more coarsely than the clypeus, clothed with thin pale pubescence, enclosure of metathorax bounded by a salient rim, rounded posteriorly, with sharp longitudinal ridges; wings hyaline, apical margins faintly clouded, nervures and stigma testaceous; tegulae picaceous, with a dull testaceous spot; legs black, inclining to dull ferruginous, apical joints of tarsi paler, hind tibiae and tarsi sometimes testaceous; abdomen smooth and shining, rather closely and finely punctured, segments depressed beyond the middle, red, the apical margins of the segments and the apical segments more or less blackish, the second segment has a black spot at base on each extreme side, the segments have an apical patch of white pubescence on each extreme side, anal fimbria brownish. Length 9--10 mm.

♂.—Resembles the female; the pubescence often more fulvous; the abdomen is black, commonly with a little red about the ventral surface of the first and second segments, but a male which I took in copula with the female shows no red about the abdomen. Length 7--8 mm.

Seventeen females, eight males. One female specimen, which I am satisfied belongs to this species, has the abdomen black, except a little red at the sides of the first and second segments. I have found this bee from April 2d to 20th on flowers of *Amelanchier canadensis*,

Erigenia bulbosa, *Salix cordata* and *Erythronium albidum*. I have taken the sexes in copula on flowers of *Salix*, April 10th.

A. Forbesii ♀.—Black; clypeus closely and strongly punctured, basal process of labrum broad; thorax rather closely and strongly punctured, like the clypeus, thinly clothed with short fulvous pubescence, enclosure of metathorax bordered by a strong rim, truncate posteriorly; wings hyaline, apical margins somewhat clouded, nervures and stigma dull testaceous, tegulæ piceous, dull testaceous exteriorly; legs black, apical joints of tarsi ferruginous; abdomen closely punctured, especially on basal half of segments, segments 2-4 depressed to the middle, bearing apically narrow fasciæ of white pubescence, interrupted broadly on the second, narrowly on the third, anal fimbria dull ferruginous. Length 10-11 mm.

Twenty females taken from April 7th to June 14th, on flowers of *Stellaria media*, *Claytonia virginica*, *Prunus serotina*, *Amelanchier canadensis*, *Pastinaca sativa*, *Heracleum lanatum*, *Erigenia bulbosa* and *Salix humilis*.

Dedicated to Prof. S. A. Forbes.

A. claytoniæ ♀.—Black; clypeus closely and strongly punctured, often with a median impunctate line, basal process of labrum rather long and narrow, emarginate or notched at tip; thorax rather sparsely punctured with rather fine, shallow punctures, thinly clothed with short, pale fulvous pubescence, enclosure of metathorax rough with strong longitudinal rugæ, with a poorly defined border; wings hyaline, nervures and stigma honey-yellow, tegulæ dull testaceous exteriorly, second submarginal cell receiving the first recurrent nervure near its apex; legs black, inclining to dull ferruginous, the tarsi more or less yellowish, the hind tarsi and sometimes the hind tibiæ yellowish; abdomen finely and rather sparsely punctured, the apical one-third of each segment depressed, segments 2-4 with apical fasciæ of whitish pubescence, interrupted on the second, anal fimbria pale fulvous. Length 8-10 mm.

♂.—Resembles the female; the tarsi, and often the posterior tibiæ, yellowish testaceous. Length 7-8 mm.

Twenty females, eleven males, taken from April 10th to June 4th, on flowers of *Claytonia virginica*, *Cercis canadensis*, *Amelanchier canadensis*, *Zizia aurea*, *Heracleum lanatum*, *Antennaria plantaginifolia* and *Salix cordata*.

Two female specimens have the wings with two submarginal cells. One male is infested by *Stylops*.

A. nubecula Sm.

One female, taken October 9th, on flowers of *Aster*.

COLLETES.

C. spinosa ♀.—Black; head short, broad; clypeus longitudinally striate, strongly punctured; labrum with a small median pit and lateral striæ; flagellum dull testaceous beneath; prothorax with large, strong, conspicuous lateral spines; mesothorax closely and coarsely punctured anteriorly, more sparsely on the disc, anteriorly the pubescence is thick and pale, more posteriorly mixed with black, thin and black on the disc; metathorax with a single series of subquadrate pits on the disc, lateral faces of posterior plate coarsely reticulated; wings hyaline, nervures, stigma and tegulæ dull blackish testaceous; legs slender; abdomen rather closely and finely punctured, sometimes the punctures appear feeble, basal and apical margins of succeeding segments, with fasciæ of white pubescence. Length 10—11 mm.

♂.—Resembles the female, pubescence longer, prothoracic spine variable, less conspicuous than in female, often short, base of second segment not fasciate. Length 8—9 mm.

Five females, fourteen males, taken on flowers of *Solidago canadensis*, *S. lanceolata* and *Polygonum hydropiper*, August 30th to October 7th.

C. latitarsis ♀.—Black, clothed with whitish pubescence; clypeus bare, or nearly so, strongly punctured, with a median longitudinal depression; labrum with a large central depression, striate on the sides; flagellum testaceous beneath; prothorax with lateral spines evident; mesothorax closely and strongly punctured, clothed with short feathery hairs, which are mostly black on the disc, whiter around the edges; scutellum with a posterior border of black hairs, which are followed behind by white ones; a patch of hairs on the pleura behind the tubercles and a few hairs on the vertex also black; metathorax sharply truncate, with a single transverse series of subquadrate pits on the disc; wings hyaline, faintly clouded beyond the marginal cell, nervures dull testaceous, stigma black, tegulæ black, dull testaceous exteriorly; legs stout, clothed with pale pubescence, mixed with fuscous, especially on the scopæ exteriorly; abdomen densely and finely punctured, especially on the second segment, third segment more finely and sparsely punctured, segments 1-4 with narrow apical fasciæ of white pubescence, fifth not fasciate. Length 11—12 mm.

♂.—Closely resembles the female; labrum usually not so depressed medially, flagellum darker, pubescence longer and paler, punctures a little less dense, anterior femora ciliate with long white pubescence, basal joint of hind tarsi remarkably broad. Length 10—11 mm.

Five females, five males, taken from July 9th to September 20th, on flowers of *Aselepias incarnata*, *Physalis virginiana* and *Polygonum hydropiper*. It is very abundant on flowers of *Physalis*.

C. Willistoni ♀.—Clypeus rough, with rather sparse, shallow punctures, with a median longitudinal depression; labrum with five deep grooves; flagellum dull testaceous beneath; prothoracic spine evident, sharp; mesothorax closely and strongly punctured, clothed with thin, pale pubescence, which is strongly mixed with blackish on the disc; scutellum with coarse punctures; disc of metathorax with a transverse series of subquadrate pits; lateral faces of posterior

plate not reticulated; wings hyaline, nervures, stigma and tegulae piceous; legs rather stout, apical joints of tarsi ferruginous; first segment of abdomen closely and rather finely punctured, second with the punctures finer and more dense, depressed at base and apex, third and following segments finely and feebly punctured, especially towards apex, appearing impunctate, apical margins of segments 1-5 with narrow fasciae of white pubescence. Length 10 mm.

One female, taken June 11th, on flowers of *Physalis*.

Dedicated to Dr. S. W. Williston.

C. heucheræ ♀.—Black, shining; clypeus rough with coarse punctures; labrum smooth, with a faint impression on each side and commonly one in the middle; mandibles rufo-piceous at tips, flagellum black, sometimes dull testaceous beneath; thorax rather finely and closely punctured, sparsely on the disc, clothed with short, thin, pale fulvous pubescence; scutellum shining and impunctate anteriorly, strongly punctured behind, enclosure of metathorax shining, with single transverse series of coarse reticulations, which are sometimes nearly obliterated; sides of posterior face of metathorax sparsely punctured with coarse, shallow punctures; wings hyaline, nervures and stigma dull testaceous, second submarginal cell narrowed one-half to marginal; tegulae black, punctured; legs slender, black, clothed with pale pubescence, apical joints of tarsi ferruginous, claws equally cleft; abdomen closely and rather finely punctured, base with thin pale pubescence, apical margins of segments 1-5 each with a rather close fascia of white pubescence; segments 2-5 have blackish pubescence on the disc, the sixth with appressed brownish hairs. Length 9-11 mm.

♂.—A little longer, more pubescent, clypeus finely punctured, labrum smooth, or with only a faint median depression; thorax more closely, and abdomen more finely punctured, tarsi paler, abdominal fasciae thinner, second submarginal cell narrowing more strongly to marginal. Length 10-12 mm.

Thirty-five females, twelve males, taken May 18th and 31st, and June 11th, on flowers of *Heuchera hispida*, *Zizia aurea* and *Polygonia nuttallii*. On the first named plant it is very abundant, being the exclusive pollinator of the flower. The female comes for honey and pollen, the red grains commonly filling her scopæ. The male visits the flower for honey, but is generally seen flying about the flowers in search of the female.

C. eulophi ♀.—Black; clypeus rough, strongly punctured, with a median longitudinal depression; labrum with a small pit on basal middle and one or two faint depressions on each side; flagellum dull ferruginous at tip; prothoracic spine concealed by pubescence; mesothorax closely and rather strongly punctured, except on the disc, which is sparsely punctured, smooth and shining, the thorax above clothed with short, rather thick fulvous pubescence, except on the disc, which is bare; disc of metathorax with a single transverse series of subquadrate pits, lateral faces of posterior plate reticulated with fine lines; wings hyaline, nervures, stigma and tegulae piceous; legs slender, posterior tarsi dull ferruginous, first segment of abdomen rather sparsely and finely punctured, second more closely and finely punctured, third and following segments with minute, feeble punctures, making them appear almost impunctate; base and

apex of second and apical margins of following segments depressed, base of second and apical margins of 1-5 with narrow fasciæ of white pubescence. Length 11 mm.

♂.—Resembles the female, pubescence longer, dense and yellow on face, base of second segment not fasciate. Length 8-10 mm.

One female, ten males, taken from June 11th to September 20th, on flowers of *Psoralea onobrychis*, *Pastinaca sativa*, *Eulophus americanus*, *Sium cicutifolium* and *Polygonum hydropiper*.

C. illinoiensis ♀.—Black; clypeus rough, with a median longitudinal depression; labrum bearing a tubercle, with a rounded pit on basal middle and faint depressions on the sides; mandibles black, rufo-piceous at tips; antennæ black, prothoracic spines concealed by pubescence; thorax strongly, densely and evenly punctured, clothed with short, thick fulvous pubescence; metathorax with a transverse series of subquadrate pits on the disc, lateral faces of posterior plate reticulated; wings hyaline, nervures and stigma black, tegulæ dull testaceous; legs slender; abdomen rather sparsely and finely punctured on first and second segments, third and following segments more finely punctured, apical margins of segments depressed and bearing rather narrow fasciæ of white pubescence. Length 10 mm.

One female, taken September 6th, on flowers of *Cnicus discolor*.

C. speciosa ♀.—Black; clypeus finely and closely punctured, clothed with short pale pubescence; labrum with a large median eminence bearing a deep pit, a shallow depression on each side; mandibles rufous; flagellum testaceous beneath; thorax clothed with short, fine, dense, fulvo-ochraceous pubescence concealing the surface, disc of metathorax concealed by pubescence, lateral faces of posterior plate not reticulated; wings hyaline, nervures, stigma and tegulæ pale testaceous; legs slender, clothed with pale pubescence, black, tarsi inclining to dull ferruginous; abdomen opaque, closely and very finely punctured, base of first segment with rather short, pale, fulvous pubescence, segments 1-5 with dense, even, apical fasciæ of appressed yellowish white pubescence, sixth segment with black pubescence. Length 10 mm.

One female, taken August 8th, on flowers of *Eryngium yuccifolium*.

C. punctata ♂.—Black; labrum with a median groove and a shallow depression on each side, mandibles rufous, flagellum dull ferruginous beneath, the prothorax with a short spine on each side; mesothorax closely and coarsely punctured, disc of metathorax with a series of large pits, lateral faces of posterior plate densely and coarsely punctured; wings fulvo-hyaline, nervures, stigma and tegulæ piceous; legs slender, dull ferruginous, tarsi pale; abdomen shining, all of the segments closely and coarsely punctured, apical margins very strongly depressed, bearing fasciæ of white pubescence. Length 11 mm.

One male, taken July 6th, on flowers of *Petalostemon violaceus*.

C. producta ♀.—Black, clothed with pale pubescence; clypeus closely and strongly punctured, except at apex, which is shining and almost impunctate; labrum smooth and shining, without depressions; mandibles rufous, widely separated from eye; flagellum black; prothoracic spines short, mesothorax smooth

and shining, sparsely and finely punctured, clothed with long, thin, dirty white pubescence; scutellum very coarsely punctured in comparison with mesothorax; metathorax with a single series of subquadrate pits, lateral faces of posterior plate shining, hardly reticulated; wings hyaline, nervures and stigma dull honey-yellow, tegulæ black; legs slender, tarsi dull ferruginous; abdomen shining, sparsely and very finely punctured, more closely on second segment, base of first segment with rather long pale pubescence, apical margins of segments 1-5 with fasciæ of thin whitish pubescence. Length 7 mm.

One male, taken June 21st, on flowers of *Apocynum cannabinum*.

SPHECODES.

S. antennariæ ♀.—Black, clothed with thin pale hairs; head broader than thorax, closely and minutely punctured; mandibles unarmed, honey-yellow, rufous at tips; antennæ dull ferruginous, flagellum paler beneath, mesothorax shining, with a slight greenish reflection, sparsely and finely punctured; disc of metathorax with several elevated longitudinal lines reaching nearly to apex, which, with the posterior face, is smooth and shining; wings hyaline, nervures dull ferruginous, only two submarginal cells, but there is a faint indication of a small second submarginal, tegulæ pale testaceous; legs dull ferruginous, growing paler towards the claws; abdomen shining, entirely ferruginous yellow. Length 5 mm.

Two females, taken April 18th, on flowers of *Antennaria plantaginifolia*.

In the left wing of each specimen the first transverso-cubital nervure is represented by a stump of a vein, and specimens may yet be found in which that nervure is entire, making the normal three submarginal cells. I have two specimens of *S. mandibularis* Cress. whose wings show only two submarginal cells. In one the first transverse cubital is represented by stumps, while the other specimen shows no trace of it.

MACROPIS.

M. steironematis ♀.—Coarsely and closely punctured, a raised line from anterior ocellus terminates in a carina between base of antennæ; base of metathorax extending narrowly on hind plate to insertion of abdomen, and truncation of abdomen, smooth, shining and impunctate; hind plate of metathorax sparsely punctured; abdominal segments depressed at base and apex. Black; flagellum dull testaceous beneath; tegulæ piceous; wings somewhat dusky, nervures black; pubescence on face, vertex, cheeks, pleure, scutellum, sides of metathorax, femora beneath, base and apical margin of second, apical margins of succeeding, and sides of all segments of abdomen, rather long and white, the pubescence of fifth segment is more abundant and interrupted with blackish in middle; disc of mesothorax with rather thin blackish pubescence; the tibiæ with pale pubescence, most dense and whitest on hind pair; pubescence of tarsi brownish, most dense and blackest on hind pair. Length 9 mm.

♂.—Resembles the female, but is more strongly pubescent, the pubescence of legs more uniformly whitish, the tarsi fulvous beneath; the face below antennæ,

spot on mandibles, and on anterior and middle knees, yellow; flagellum testaceous beneath, anterior tibiæ with more or less of rufous in front. Length 8—9 mm.

Twenty-four males and two female specimens. I have taken it June 21st to 26th, on flowers of *Steironema lanceolatum*, *Apocynum cannabinum* and *Ceanothus americanus*.

The posterior tibiæ of male are unarmed, except a short blunt process between the spurs.

PHILEREMUS.

P. illinoensis ♀.—Black, closely and strongly punctured; middle of face, cheeks, sides of prothorax, pleuræ, sides of metathorax, two short lines on anterior middle of mesothorax, and line encircling scutellum with short, white, feathery, or scale-like pubescence; head not broader than thorax, clypeus at apex, sometimes, and mandibles ferruginous; antennæ dull ferruginous, flagellum paler beneath; scutellum slightly bilobed; legs inclining to dull ferruginous, especially at the joints, clothed with short pale glittering hairs; wings hyaline, faintly clouded at apex and in marginal cell, nervures fuscous; second submarginal not greatly shorter than first, unarrowed about one half towards marginal, receiving the second recurrent nervure near its apex, first submarginal receiving the first recurrent near its apex; tegulæ pale testaceous exteriorly; abdomen fulvo-ferruginous, depressed apical margins of segments golden, sometimes the disc is more or less blackish, densely and confluent punctured, segments 2-4 depressed at base, 1-4 with interrupted basal fasciæ of short white hairs, on first forming rounded patches, segments 2-4 with patches of pubescence on each extreme side of apical margin, fifth segment depressed laterally, elevated on the disc, the elevated portion and the apex clothed with white pubescence. Length 5 mm.

♂.—Resembles the female, antennæ blacker, flagellum paler beneath, apical margins of fifth and sixth segments with fasciæ of white pubescence. Length 4—5 mm.

The segments of the abdomen are commonly ferruginous, with golden apical margins and a little black on the disc. Often the black is wanting. In one male specimen the segments are entirely black, except the golden apical margins.

Three females, nine males, taken August 14th and 23d, on flowers of *Lespedeza procumbens*.

HERIADES.

H. philadelphi ♀.—Black, form slender, closely and finely punctured; head broader than thorax, long; clypeus short, labrum long, somewhat surpassing the open mandibles, its sides parallel, apex three toothed, the middle tooth longer and strongly elevated, mandibles long and narrow; pleura with a little thin, pale pubescence, enclosure of metathorax crescentic, rough; wings hyaline, faintly clouded at apex and in the submarginal cell, stigma black, nervures and tegulæ

piceous; legs black, clothed with thin pale pubescence, apical joints of tarsi testaceous; abdomen slender, sides parallel, fasciæ wanting, a little thin pale pubescence on the sides at apex, ventral scopa white. Length 6—8 mm.

♂.—Resembles the female; the head very much shorter and smaller, as also the mandibles and labrum; antennæ longer, reaching to metathorax, flagellum dull testaceous beneath; seventh segment of abdomen with two long spines in middle and a short blunt one on each side. Length 5—7 mm.

Twenty-seven females, twenty-eight males, taken on May 29th, on flowers of *Philadelphus grandiflorus*.

MEGACHILE.

M. rufimanus ♀.—Form as in *M. pugnata* and *M. inimica*; head large, long, strongly produced behind eyes, form much as in *M. pugnata*, but without a spine under cheek; clypeus very broadly and deeply emarginate; labrum as long as mandibles, broad and three lobed at apex, strongly produced at tip above into a pyramidal process; mandibles long and very slender, three toothed at tips; mesothorax closely, coarsely and strongly punctured, clothed with short, thin, black pubescence, bearing anteriorly two short lines of white pubescence lying about 1 mm. apart; scutellum more coarsely and sparsely punctured; wings fusco-hyaline, the marginal cell clouded along the costal margin; legs black, slender, tibiæ spined at apex exteriorly; abdomen coarsely and strongly punctured, more closely at base, sides and apex, more sparsely on disc, triangular patch on each side of first segment, apical margins of segments 2-4 and base of sixth with white pubescence, ventral scopa white, except on sixth segment, where it is black. Length 11—13 mm.

♂.—Resembles the female; the head is much smaller, the face closely clothed with white pubescence; the mandibles and labrum are shorter, the latter more rounded at tip and not strongly produced above; the anterior legs simple, the coxæ unarmed; anterior femora and tibiæ rufous in front, the carina of sixth segment emarginate in the middle; wings more hyaline than in female. Length 9—11 mm.

Five females, eleven males, taken from June 26th to July 19th, on flowers of *Psoralea onobrychis*, *Lobelia leptostachys* and *Nepeta cataria*.

XENOGLOSSA.

X. ipomœæ ♀.—Black, the face, vertex, thorax above, and base of first segment of abdomen clothed with bright fulvous pubescence; clypeus thinly clothed with appressed, glittering yellow pubescence, rough, with shallow punctures, apex with a broad shallow emargination on each side; mandibles orange-yellow, black at base and at extreme tip; flagellum dull ferruginous; cheeks and thorax beneath with pale pubescence; thorax above with very dense, bright fulvous pubescence; wings fusco-hyaline, nervures black, tegulæ reddish testaceous; legs black, apical joints of tarsi dull ferruginous, tips of claws black, tooth of hind claw small, short; hairs on front legs paler, on middle and hind pairs more fuscous, scopa thin, with the hairs black at base, pale at tips; abdomen black, opaque, with shallow punctures, first segment at base with pubescence

like that of thorax, but a little paler, black beyond, second at base with short, dense, grayish pubescence, black beyond, third and fourth black at base, grayish beyond, with pruinous tomentum towards apex, fifth similar, but with long fuscous pubescence towards apex, sixth with fuscous pubescence. Length 13—16 mm.

♂.—Resembles the female; apex of clypeus with the lateral emarginations narrower, deeper and more rounded, making the clypeus three lobed, middle lobe concave above, slightly emarginate at tip; transverse band near apex of clypeus, labrum and base of mandibles pale yellowish; middle of mandibles toothed exteriorly; antennæ reaching to scutellum, flagellum testaceous beneath, black at tip; pubescence of legs pale, hind tarsi slender, front and middle claws nearly equally cleft, hind claw with a short triangular tooth at extreme base; segments 3-6 of abdomen with pruinous tomentum. Length 13—16 mm.

Three females, four males, taken from July 22d to August 20th, on flowers of *Ipomœa pandurata*.